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Air-Conditioned Switching Cabinet

The invention relates to an air-conditioned switchgear cabinet with wall elements and at least one cabinet door, as well as an air-conditioner and/or heat exchanger.

In known air-conditioned switchgear cabinets, the air-conditioner is a component separate from the switchgear cabinet, which must be placed on the switchgear cabinet and brought into air-conducting connection with the interior of the switchgear cabinet. In this case the cover of the switchgear cabinet must be provided with openings, which are matched to the air-aspirating and air-outlet openings of the air-conditioner, such as represented, for example, in DE 37 10 566 and DE 37 35 551 C1. Such a design of a switchgear cabinet is particularly suited for retrofitting the switchgear cabinet with an air-conditioner, but requires an increased outlay for parts for the air-conditioner designed as a separate unit.

Switchgear cabinets, or respectively walls of switchgear cabinets are also known, wherein an air-conditioner (or components thereof) has been installed in the interior of the cabinet body or rack of the switchgear cabinet, as shown in DE 88 07 768 U1. However, equipping an air-conditioned switchgear cabinet in this way has the disadvantage that space for assemblies in the interior is lost and that air-conditioning a fully equipped switchgear cabinet at a later time is no longer possible.

As shown in DE 37 38 941 C1 and DE 40 13 372 A1, it has also already been provided to install an air-conditioner in an open side of a rack. This has the advantage that the interior can be practically completely available for assemblies and that in

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certain installation situations of the cooling device a later installation on a completely equipped switchgear cabinet is also possible. However, defined additional fastening elements must be provided for this.

It is the object of the invention to provide an air-conditioned switchgear cabinet of the type mentioned at the outset which is considerably simpler in design and can be delivered, without hampering the installation of assemblies in the interior, with or without an air-conditioner and/or heat exchanger, but always permits the its later installation.

In accordance with the invention, this object is attained in that the air-conditioner and/or heat exchanger is integrated in a wall element or the cabinet door, wherein the wall element or the cabinet door are embodied as a housing for receiving the components of the air-conditioner and/or the heat exchanger.

With this design, the switchgear cabinet and the air-conditioner and/or the heat exchanger constitute one delivered unit as a rule, which leaves the interior completely free for installations by the user. But the wall element or the cabinet door with the air-conditioner and/or the heat exchanger constitute a further structural unit which can be cost-effectively produced and which can be retrofitted at any time as the replacement for a wall element or the cabinet door of a non-air-conditioned switchgear cabinet. It is possible in this way to provide a fully equipped switchgear cabinet with air-conditioning by means of an air-conditioner and/or heat exchanger at a later time.

If in accordance with one embodiment it has been provided that the wall element or the cabinet door border a receptacle space which adjoins the interior of the rack or the cabinet body,

the interior is outwardly expanded in the simplest way and the wall element of the cabinet door retains the original function as a closure of the switchgear cabinet, but constitutes the housing for receiving the components of the air-conditioner and/or the heat exchanger.

A further embodiment provides that the components of the air-conditioner and/or the heat exchanger are connected and wired with each other ready for operation. It is then merely required to connect the air-conditioner and/or the heat exchanger with the electric power supply for the switchgear cabinet.

Air circulation in the switchgear cabinet can be directly affected in that the components of the air-conditioner and/or the heat exchanger are covered toward the interior of the cabinet body of the rack by means of a cover and that, with the integration of an air-conditioner, the cover is provided with air-aspirating and air-outlet openings, or that, with the integration of a heat exchanger, the cover is provided with air-inlet openings and the wall element or the cabinet door with air-outlet openings.

The invention will be explained in more detail by means of exemplary embodiments schematically represented in the drawings. Shown are in:

Fig. 1, a schematic representation of an opened switchgear cabinet with a rack, wherein an air-conditioner is integrated in a wall element, and

Fig. 2, a schematic representation of an opened switchgear cabinet with a cabinet body, wherein an air-conditioner is integrated in the cabinet door.

Fig. 1 shows a switchgear cabinet with a rack 10, which is closed on three sides by means of a bottom sheet metal plate 17, a cover sheet metal plate 18 and a wall element 19.

The left side of the rack 10, which is delimited by vertical frame legs 11 and 12 and horizontal frame legs 16, is closed with a wall element 20, in which an air-conditioner with the components 23, 24 and 25 is integrated. The front of the rack 10, delimited by the frame legs 11, 13, 14 and 15 is closed by means of a cabinet door 30. The cabinet door 30 is hinged to the vertical frame leg 13 by means of hinges 32 and can be fixed in the closed position by means of a lock 31. The cabinet door can be reinforced on the inside by means of a door frame 33 placed on it.

The wall element 20, which is trapezoidal in cross section, with inclined wall elements 21 and 22, forms a tub-like housing, in which the components 23, 24 and 25 of the air-conditioner and/or the heat exchanger have been installed, so that an integrated component is created which can be connected with the rack 10 like a normal wall element 19.

The components 23, 24 and 25 can be covered in the wall element 20 by means of a cover, which is provided with air-aspirating and air-outlet openings. In this case the appropriately designed components of the air-conditioner can follow directly behind it. When integrating a heat exchanger, the cover can be provided with inlet openings and the wall element 20 with air-outlet openings. The arrangement of the air-inlet openings and air-outlet openings and the distribution of the components 23, 24 and 25 decide the circulation of air in the heat exchanger and is provided in a known manner.

In place of the rack 10 and the wall elements, it is also possible to use a cabinet body 10', which is only open at its front, as shown in Fig. 2. Then the cabinet door 30 is designed as the housing for the components 23, 24 and 25 of the air-conditioner and/or the heat exchanger. The cabinet door 30 with the integrated air-conditioner and/or heat exchanger is then hinged on the cabinet body like a normal cabinet door. As a rule, the air-conditioned switchgear cabinet with the air-conditioner and/or heat exchanger integrated in the cabinet door 30 is made available as a delivered unit and can be purchased with components which are connected and wired ready for operation. The cabinet door with the integrated air-conditioner and/or heat exchanger can also be ordered later as a component and can be used later for air-conditioning a completely built and equipped switchgear cabinet. In this case only the cabinet door needs to be exchanged.